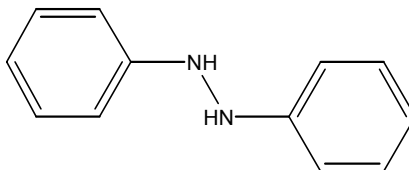


HYDRAZOBENZENE

CAS No. 122-66-7

First Listed in the *Second Annual Report on Carcinogens*



CARCINOGENICITY

Hydrazobenzene is *reasonably anticipated to be a human carcinogen* based on sufficient evidence of carcinogenicity in experimental animals (NCI 92, 1978). When administered in the diet, hydrazobenzene induced hepatocellular and squamous cell carcinomas, squamous cell papillomas of the Zymbal gland, ear canal, and skin of the ear in male rats; mammary adenomas in female rats; and hepatocellular carcinomas in female mice (NCI 92, 1978). When injected subcutaneously in sunflower seed oil, hydrazobenzene induced mammary microfollicular carcinomas and adenomas associated with fibroadenomas, liver adenomas, and sebaceous squamous cell carcinomas of the Zymbal gland in female rats, and rhabdomyosarcomas of the subcutaneous fat, liver adenomas and hemangiomas, and lung adenomas in mice of both sexes. When applied topically in benzene, hydrazobenzene induced increased incidences of lung and liver adenomas and hemangiomas in mice of both sexes (Pliss, 1974). When injected intraperitoneally in tricaprylin, hydrazobenzene induced pulmonary alveolar-bronchial adenomas in mice of both sexes (Maronpot, 1986). In view of an NCI/OTA correlative interpretation, these data can be considered sufficient evidence of carcinogenicity in animals (OTA, 1981; Griesemer and Cueto, 1980).

One epidemiology study supports some carcinogenic effects of hydrazobenzene in humans (CHIP, 1981b). However, IARC has not reviewed this material.

PROPERTIES

Hydrazobenzene is a colorless to light yellow solid. It is insoluble in acetic acid, slightly soluble in water and benzene, and very soluble in ethanol. When heated to decomposition, hydrazobenzene emits toxic fumes of nitrogen oxides (NO_x).

USE

Hydrazobenzene has been used primarily in the dye manufacturing industry as the precursor of the dye intermediate benzidine. It is also utilized as an intermediate in the manufacture of pharmaceuticals such as sulfapyrazone and phenylbutazone (antiarthritic drugs). Some minor direct uses of hydrazobenzene are as an anti-sludging additive to motor oil, desuckering agent for tobacco plants, reductant in the reclamation of rubber, component of experimental organometallic polymers, component in photochromic resin compositions, and in polymerization reactions (CHIP, 1981b). It is also used in the manufacture of hydrogen peroxide and has been evaluated as an agent for insecticides (Spectrum, 1999).

PRODUCTION

Hydrazobenzene is no longer produced in the United States (EPA, 1998). The Chem Sources USA directory identified sixteen suppliers of hydrazobenzene in 1986 (Chem Sources, 1986). United States imports of hydrazobenzene exceeded 22,000 lb in 1983 (USITCa, 1984). The 1979 TSCA Inventory identified one company producing 550,000 lb of hydrazobenzene and three companies importing 550,000 lb in 1977. The CBI Aggregate was between 1 million and 100 million lb (TSCA, 1979). Previous data indicated seven producers and importers of hydrazobenzene, with domestic production of 373,000 lb annually and imports of 135,000 lb. Dye manufacturing facilities produce additional unknown quantities during reduction of nitrobenzene to hydrazobenzene prior to its rearrangement to benzidine.

EXPOSURE

The primary routes of potential human exposure to hydrazobenzene are inhalation, ingestion, and dermal contact. The greatest potential for exposure to hydrazobenzene occurs in the benzidine-based dye industry and when the compound is used as an intermediate in the manufacture of certain pharmaceuticals. No data were located on present levels of exposure or on the number of workers exposed to hydrazobenzene in the United States. There do not seem to be any uses of hydrazobenzene which would result in any appreciable exposure of consumers to this compound. Practically no data were found on amounts of hydrazobenzene released to the environment. The average concentration of hydrazobenzene in the wastewater from the ink-formulating industry was stated to be 3,800 µg/L. Hydrazobenzene has been found to be present in drinking water at levels of 1 µg/L (1 ppb). Hydrobenzene will rapidly degrade in the atmosphere by a combination of air oxidation and photolysis (Spectrum, 1999). It was determined that the half-life for the decomposition of 100 µg hydrazobenzene/L in a municipal sewage effluent was 60 minutes if oxygen was removed from the sewage, but only 15 minutes if the oxygen was not removed (CHIP, 1981b). Hydrobenzene is moderately persistent in water with a half-life of 20-200 days. Around 84.5% of hydrazobenzene will eventually end up in water, 6.25% in terrestrial soils, 5.8% in aquatic sediments and 3.7% in air (TRIFacts, 1989).

REGULATIONS

EPA regulates hydrazobenzene under the Clean Water Act (CWA), Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Resource Conservation and Recovery Act (RCRA), Superfund Amendments and Reauthorization Act (SARA), and Toxic Substances Control Act (TSCA). Hydrazobenzene is included on lists of chemicals for which water quality criteria have been established under CWA. A statutory reportable quantity (RQ) of 10 lb has been established for this chemical under CERCLA. Under RCRA, SARA, and TSCA, hydrazobenzene is subject to report/recordkeeping requirements. SARA sets threshold amounts for hydrazobenzene used, manufactured, or processed at a facility. Manufacturers, importers, and processors of hydrazobenzene are required to submit to EPA copies and lists of unpublished health and safety studies under TSCA. OSHA regulates hydrazobenzene under the Hazard Communication Standard and as a chemical hazard in laboratories. Regulations are summarized in Volume II, Table B-73.